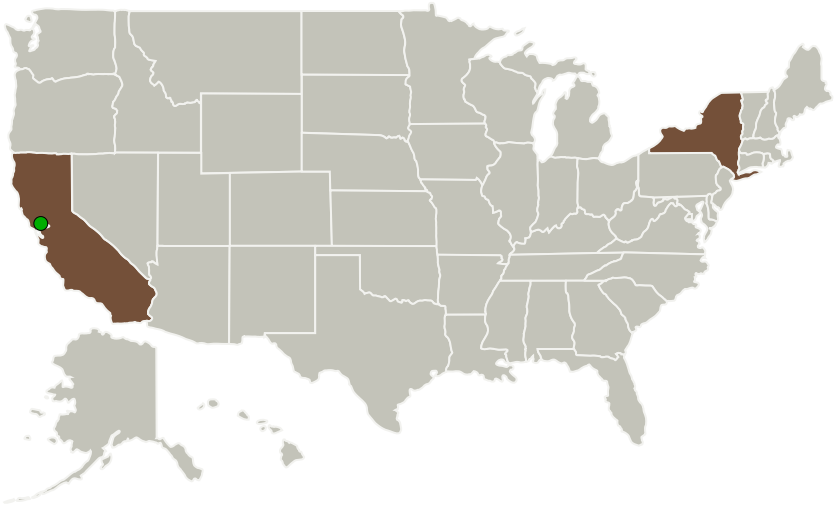
# Lasercom for Intra-Nanosat Communication (LINC), Phase I

Completed Technology Project (2012 - 2012)

## Project Introduction

Earth orbiting spacecraft, deep space science missions, and unmanned aerial vehicles are facing increasing data volumes to be transmitted to ground stations. Laser Communication (Laser Com) terminals are necessary to handle the demand. Additionally, nano class satellites have emerged as desirable platforms due to their low cost, shorter build, and multitude of available launch configurations. Honeybee Robotics Spacecraft Mechanisms Corp. proposes to develop a LaserCom terminal for a small satellite. We will focus the effort within the constraints of a 6U CubeSat. The Phase 1 effort will define a lasercom system architecture which satisfies the challenging packaging and resource constraints evident with nanosatellites. We will leverage our nano-sat based attitude control actuator technology (TORC) to ameliorate packaging challenges for the pointing mechanisms. Analysis and simulation of the optical subsystem will enable design and down-selection of components to a system which can provide the necessary line-of-sight stability and link margin to maintain a 2Gb/sec link with less than 10-6 BER. A prototype fine pointing mechanism will be built and tested to demonstrate proof-of-concept of a miniaturized pointing subsystem. Ultimately a lasercom system will be defined to be built in Phase II to arrive at a minimum TRL6 during the Phase 2 effort.

## Primary U.S. Work Locations and Key Partners

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Honeybee Robotics, Ltd. | Lead Organization | Industry | Pasadena, California |
| Ames Research Center(ARC) | Supporting Organization | NASA Center | Moffett Field, California |

| Primary U.S. Work Locations | |
|---|---|
| California | New York |

## Project Transitions

**February 2012:** Project Start

**August 2012:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/138246)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Honeybee Robotics, Ltd.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Erik Mumm

**Co-Investigator:**

Erik Mumm

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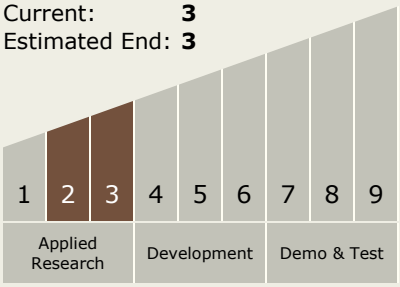
## Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**




## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.4 Pointing, Acquisition and Tracking (PAT)

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System